

# **An Examination of Learning Style Preferences among Egyptian University Students**

**Mohamed Sywelem  
Bayoumi Dahawy  
Suez Canal University, Egypt**

**Chih-husan Wang  
Auburn University**

## **Abstract**

The purpose of this research was to examine teacher students' learning style preferences and to examine the extent gender, seniority and academic major affect the students' preferences.

## **Introduction**

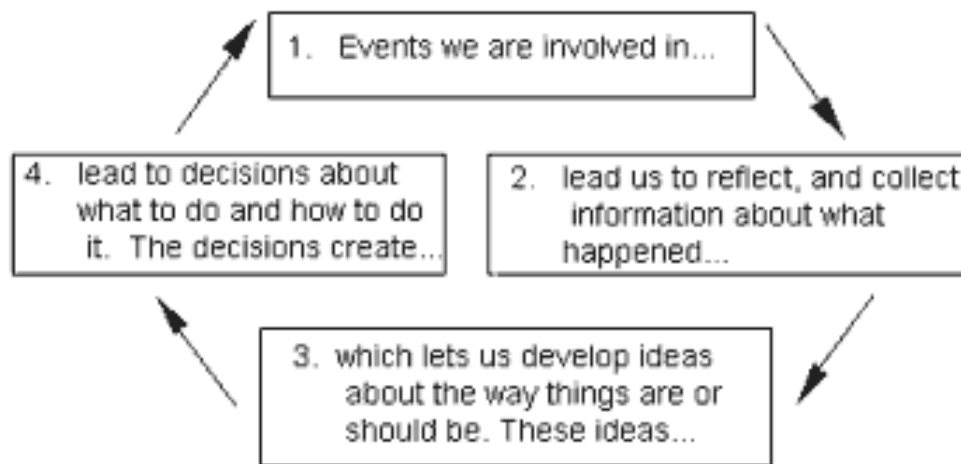
Students learn in many ways – by seeing and hearing, reflecting and acting, reasoning logically and intuitively, and memorizing and visualizing. The ways in which an individual characteristically acquires, retains, and retrieves information are collectively termed the individual's learning style (Felder, 1995). Knowing the learning styles of the learners aids the designer or instructor to develop a curriculum to address various needs of the learners in a group or class (Pallapu, 2007).

Kirby (1979) mentioned that the term “learning style” came into use when researchers began to look for ways to combine course presentation and materials to match the needs of each learner. Diagnosing and interpreting learning styles provide important data as to how individuals perceive, interact with, and respond to the learning environment (Griggs, 1991). The literature seems to suggest that diagnosing students learning styles can be an easy and effective process because students can identify their own learning styles and score higher on tests when they are complimented with a teaching style that matches their learning style (Wilson-Hull, 2008).

## **Literature Review**

Educational research has identified a number of factors that account for some of the differences in how students learn. One of these factors, learning styles, is broadly described as “cognitive, affective, and physiological traits that are relatively stable indicators of how learners perceive, interact with, and respond to the learning environment” (Reid, 1987, p. 87).

Dunn, Dunn and Perrin (1994) described learning styles as “the way in which each learner begins to concentrate on, process, and retain new and difficult information - that interaction occurs differently for each individual” (p. 2). Felder and Spurlin (2005) describe learning styles as “characteristic strengths and preferences in the ways they take in and process information” (p. 1). Learning styles are often influenced by heredity, upbringing, and current environmental demands. Individuals have a tendency to both perceive and process information differently (Gilbert, 2008). The concept of learning style can be best understood by taking a closer look at the process of learning itself. According to Kolb (1984), this process consists of four basic steps. These steps are outlined in Figure 1 below:



**Figure 1**

According Felder et al. (2002, p. 3), “people have different learning styles that are reflected in different academic strengths, weaknesses, skills, and interests. Understanding learning style differences is thus an important step in designing balanced instruction that is effective for all students.”

Learning styles refer to the concept that we, as individuals, process and perceive information in different ways. There are many different factors that can lead to the differences that arise within learning styles. These factors include, but are not limited to, personality, ability to process information, self-efficacy, sensory intake processes or some complex combination of these and other differences (Institute for Learning Styles Research, n.d.). Using a variety of assessment tools, individuals can gauge their own interest levels for a set of criteria to help establish the methods in which they obtain much of their information about the world around them. One assessment tool that can be used in establishing a person’s learning style is the Perceptual Modality Preference Survey (PMPS). This survey focuses on seven perceptual sensory intake methods that help shape how, we as individuals, view the world around us. There are seven perceptual styles: print, aural, visual, interactive, haptic, kinesthetic, and olfactory (Institute for Learning Styles Research, n.d.).

The Perceptual Learning Styles theory says that most of what we learn comes from our five senses. The Perceptual Learning Style theory defines the seven learning styles as follows (Davis, 2007):

- o The print learning style individual prefers to see the written word.
- o The aural learner refers to listening.
- o The interactive learner refers to verbalization.
- o The visual learner refers to seeing visual depictions such as pictures and graphs.
- o The haptic learners refer to the sense of touch or grasp
- o The kinesthetic learner refers to whole body movement.
- o The olfactory learner refers to sense of smell and taste.

According to Eggen and Kauchak (2004), the concept of learning styles has at least three implications for teachers. It can remind educators that they need to vary instructions. It should remind educators of the need to help students become more aware of the ways they most effectively learn. In addition, it should remind educators that students are different and that they should increase their sensitivity to those differences.

## **Methods**

The Perceptual Modality Preference Survey (PMPS) learning style survey was provided to a sample of ( $N=221$ ) teacher education students in Ismailia College of Education in Egypt. The purpose of the study was to determine the learning style preferences among teacher education students in an Egyptian University and whether or not gender, seniority and department affect the learning style preferences.

The research questions addressed in this study were:

- o What are the differences between males and females in relation to learning style preference?
- o What are the differences between freshmen and seniors in relation to learning style preference?
- o What are the differences in relation to learning style preference among teacher students based on department variable?

The null hypothesis was that gender, seniority and department do not have an effect on the learning style preferences. The alternative hypothesis was that gender, seniority and department do have an effect on the learning style preferences.

## **Participants**

The participants in this study included teacher education students from Ismailia College of Education in Egypt. Table 1 presents the study sample demographics.

Table 1

*Demographics*

|               | Items          | #   | %    |
|---------------|----------------|-----|------|
| Gender        | Females        | 176 | 79.6 |
|               | Males          | 45  | 20.4 |
| Year          | Freshman       | 104 | 47.1 |
|               | Senior         | 117 | 52.9 |
| Majors        | Arabic         | 69  | 31.2 |
|               | English        | 69  | 31.2 |
|               | French         | 12  | 5.4  |
|               | Social Studies | 31  | 14.0 |
|               | Math           | 31  | 14.0 |
|               | Kindergarten   | 9   | 4.1  |
| Total         |                | 221 |      |
| <i>N</i> =221 |                |     |      |

**Instrumentation**

The Perceptual Modality Preference Survey (PMPS) ( paper and pencil version) consisted of 42 questions with forced choice items with four options (Always, usually, seldom, or never). The participants were expected to select the appropriate answer for each question. The researchers designed the survey to also collect demographic information from the participants.

**Results**

Data were analyzed using SPSS 18.0. Means and standard deviations were used to describe subjects' learning style and personality type preferences (Tables 2-3). A 2X2X3 (Grade level, Gender, and Major) between-subjects multivariate analysis of variance (MANOVA) was conducted to determine if there was group difference on the seven learning styles (aural, haptic, interactive, kinesthetic, olfactory, print, and visual). No extreme scores, outliers, or statistically assumption violations were noted in the present data. The Box's *M* test was statistically significant ( $p < 0.001$ ), indicating that the assumption of equal dependent variables covariance matrices was violated, thus, the Pillai's trace was used to assessing the multivariate effect.

With the use of Pillai's trace criterion, the linear combined dependent variables were statistically significantly related to the interaction effect of Grade level and Majors (Pillai's trace=0.35,  $F(35,100)=2.16$ ,  $p < 0.0001$ ) with moderate effect size (partial  $\eta^2=0.07$ ).

Table 2

*Participant Learning Styles by Grade Level and Gender*

| Learning Styles | Grade Level |       | Senior |       | Gender Male |       | Female |       | Total |       |
|-----------------|-------------|-------|--------|-------|-------------|-------|--------|-------|-------|-------|
|                 | Freshman    |       |        |       |             |       |        |       |       |       |
|                 | Mean        | Std.  | Mean   | Std.  | Mean        | Std.  | Mean   | Std.  | Mean  | Std.  |
| Aural           | -3.19       | 8.44  | 1.15   | 9.58  | -2.22       | 8.39  | -.56   | 9.51  | 1.38  | 9.57  |
| Haptic          | 6.11        | 8.79  | 2.62   | 10.11 | 3.71        | 9.41  | 4.40   | 9.73  | 2.01  | 7.29  |
| Interactive     | 2.44        | 8.04  | 4.74   | 8.52  | 2.18        | 6.47  | 4.04   | 8.75  | 3.52  | 8.97  |
| Kinesthetic     | 1.39        | 12.26 | 1.85   | 12.97 | 6.76        | 14.41 | .33    | 11.81 | .39   | 12.63 |
| Olfactory       | -6.76       | 11.02 | -9.82  | 11.57 | -5.51       | 11.46 | -9.11  | 11.29 | -8.41 | 12.42 |
| Print           | .00         | 7.61  | 5.17   | 12.23 | 2.44        | 8.64  | 2.81   | 11.09 | 6.36  | 10.72 |
| Visual          | 8.21        | 11.10 | 7.54   | 9.91  | 4.33        | 8.63  | 8.76   | 10.72 | 4.51  | 10.30 |

Table 3

*Participant Learning Styles by Majors*

| Learning Styles | Arabic        | English       | French        | Social Studies | Math          | Kindergarten  |
|-----------------|---------------|---------------|---------------|----------------|---------------|---------------|
| Aural           | -1.38 (9.49)  | 1.38 (9.57)   | 2.83 (11.50)  | -3.16 (8.49)   | -4.42 (7.42)  | .33 (6.04)    |
| Haptic          | 2.80 (10.14)  | 2.01 (7.29)   | -1.50 (14.07) | 9.97 (7.65)    | 8.45 (9.78)   | 6.33 (8.70)   |
| Interactive     | 4.77 (7.38)   | 3.52 (8.97)   | 4.33 (9.78)   | 3.68 (7.51)    | 5.06 (6.09)   | -9.56 (8.83)  |
| Kinesthetic     | 1.90 (12.03)  | .39 (12.63)   | .75 (11.29)   | -.90 (11.17)   | 8.94 (14.21)  | -6.00 (8.83)  |
| Olfactory       | -7.13 (11.53) | -8.41 (12.43) | -7.33 (11.87) | -12.03 (8.42)  | -8.97 (10.02) | -4.56 (14.32) |
| Print           | 2.81 (10.06)  | 6.36 (10.72)  | 4.42 (12.37)  | -2.52 (6.47)   | -1.29 (11.80) | 4.11 (9.29)   |
| Visual          | 7.28 (10.97)  | 4.51 (10.30)  | 6.42 (7.19)   | 14.19 (9.42)   | 9.77 (6.46)   | 11.56 (15.44) |

The main effect of Grade level, of Gender, and of Majors also reached statistically significant with moderate effect size (Grade level: Pillai's trace=0.08,  $F(7,196)=2.48$ ,  $p=0.018$ , partial  $\eta^2=0.08$ ; Gender: Pillai's trace=0.07,  $F(7,196)=2.18$ ,  $p=0.038$ , partial  $\eta^2=0.07$ ; Majors: Pillai's trace=0.45,  $F(35,100)=2.79$ ,  $p<0.0001$ , partial  $\eta^2=0.09$ ).

The Univariate ANOVAs were conducted on each dependent measure separately to determine the locus of the statistically significant multivariate interaction effect between Grade level and Majors. The results indicated that there were statistically significant on Aural, Olfactory, Print, and Visual learning styles with moderate effect size (Aural:  $F(5,202)=3.45$ ,  $p=0.005$ , partial  $\eta^2=0.07$ ; Olfactory:  $F(5,202)=5.41$ ,  $p<0.001$ , partial  $\eta^2=0.11$ ; Print:  $F(5,202)=3.47$ ,  $p=0.005$ , partial  $\eta^2=0.08$ ; Visual:  $F(5,202)=3.41$ ,  $p=0.006$ , partial  $\eta^2=0.08$ ).

As for the Grade Level main effect, the results indicated that there were statistically significant difference on Kinesthetic learning style between freshmen and seniors with small to moderate effect size ( $F(1,202)=6.28$ ,  $p=0.013$ , partial  $\eta^2=0.03$ ). Further investigation on the Grade Level group means revealed that the seniors ( $M=1.85$ ) had higher scores than the freshmen did ( $M=1.39$ ). For the Gender main effect, the results indicated that there were statistically significant differences on Haptic and Kinesthetic learning styles between male and female students with small to moderate effect size ( $F(1,202)=4.98$ ,  $p=0.027$ , partial  $\eta^2=0.02$ ,  $F(1,202)=6.45$ ,  $p=0.012$ , partial  $\eta^2=0.03$ , respectively). An inspection of gender group means showed that female students ( $M=4.40$ ) had higher scores on Haptic, while male students had higher scores on Kinesthetic ( $M=6.76$ ).

For the Majors main effect, the results indicated that there were statistically significant group differences on Haptic, Interactive, and Kinesthetic learning styles among students with different majors with moderate to large effect size ( $F(5,202)=5.13$ ,  $p<0.001$ , partial  $\eta^2=0.11$ ,  $F(5,202)=6.29$ ,  $p<0.001$ , partial  $\eta^2=0.14$ ,  $F(5,202)=4.32$ ,  $p=0.001$ , partial  $\eta^2=0.10$ , respectively). LSD post hoc test suggested that Arabic, English, and French majors had lower scores on Haptic learning style than social studies and math majors. On the other hand, the kindergarten majors had lower scores on Interactive learning styles than all other majors. In addition, the math majors had higher scores on Kinesthetic learning style than all other majors (see Table 4).

## Conclusion

As a general conclusion from the data presented, it would be in the best interest of instructors to maintain a constant awareness of the variety of learning styles represented throughout the student body. Delivery and assessment methods which recognize the diverse array of learning preferences would foster a grounded learning environment.

Table 4

*LSD Post Hoc Test on Learning Style by Majors*

| Learning Style | Comparison                      | Mean<br>Difference | p-value |
|----------------|---------------------------------|--------------------|---------|
| Haptic         | Arabic vs. Social Studies       | -7.17              | 0.000   |
|                | Arabic vs. Math                 | -5.65              | 0.003   |
|                | English vs. Social Studies      | -7.95              | 0.000   |
|                | English vs. Math                | -6.44              | 0.001   |
|                | French vs. Social Studies       | -11.47             | 0.000   |
|                | French vs. Math                 | -9.95              | 0.001   |
|                | French vs. Kindergarten         | -7.83              | 0.045   |
| Interactive    | Kindergarten vs. Arabic         | -14.32             | 0.000   |
|                | Kindergarten vs. English        | -13.08             | 0.000   |
|                | Kindergarten vs. French         | -13.89             | 0.000   |
|                | Kindergarten vs. Social Studies | -13.23             | 0.000   |
|                | Kindergarten vs. Math           | -14.62             | 0.000   |
| Kinesthetic    | Math vs. Arabic                 | 7.04               | 0.007   |
|                | Math vs. English                | 8.54               | 0.001   |
|                | Math vs. French                 | 8.19               | 0.044   |
|                | Math vs. Social Studies         | 9.84               | 0.001   |
|                | Math vs. Kindergarten           | 14.94              | 0.001   |

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### **Author's Note**

Drs. Mohamed Sywelem and Bayoumi Dahawy are faculty members of the Suez Canal University in Egypt.

Dr. Chih-hsuan Wang is a visiting faculty member of Auburn University.